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1 Formulation of design rules for NMR imaging coil by using symbolic manipulation

John F. Schenck, M. A. Hussain

August 1981 **Proceedings of the fourth ACM symposium on Symbolic and algebraic computation**

Full text available: pdf(537.79 KB) Additional Information: full citation, abstract, references, index terms

A common problem in electrical technology is to design a current carrying coil that will produce a given magnetic field. For over a hundred years an equation, the Biot-Savart law, has been available that defines precisely the magnetic field at any point as a line integral along the path of the electric currents that are the sources of the field. In principle then, the design problem is straightforward - it is merely necessary to invert the Biot-Savart law and find a path whose line integral ...

2 CYCLONE: automated design and layout of RF LC-oscillators

C. De Ranter, B. De Muer, G. Van der Plas, P. Vancorenland, M. Steyaert, G. Gielen, W. Sansen

June 2000 **Proceedings of the 37th conference on Design automation**

Full text available: pdf(163.78 KB) Additional Information: full citation, abstract, references, citings, index terms

This paper presents an automated, layout-aware RF LC-oscillator design tool, called CYCLONE that delivers an accurate and optimal LC-oscillator design, from specification to layout. The tool combines the accuracy of device-level simulation and finite element analysis with the optimisation power of simulated annealing algorithms and is verified with experimental results.

3 An algorithm for modeling saturating magnetic devices

George A. O'Sullivan

June 1970 **Proceedings of the June 1970 design automation workshop on Design automation**

Full text available: pdf(541.28 KB) Additional Information: full citation, abstract, references, index terms

Nonlinear magnetic devices present complexities in circuit analysis that are not readily solved by conventional techniques. Two algorithms are developed that provide computer-aided techniques for the classical problems of saturation, hystersis and the multicircuit device. Hystersis, long recognized as a difficult analytical problem, is managed by dual numerical integration for each nonlinear magnetic device.

4 Man-machine interaction in the design of rotating electrical machines

h be c g e cf

Bernard J. Bennington
January 1969 **Proceedings of the 6th annual conference on Design Automation**

Full text available: pdf(1.08 MB) Additional Information: full citation, abstract, references, citings, index terms

When engineering design is considered as a part of the more general study of system design or problem solving, it becomes apparent that it subdivides into the separate problems of design analysis, design synthesis and system identification. Rotating electrical machinery presents a uniquely complicated system of non-linear, constrained, discrete and discontinuous relationships. The economical solution of the design of electrical machines in our industrial society can only be achie ...

5 A static magnetic memory system for the ENIAC
Isaac L. Auerbach
May 1952 **Proceedings of the 1952 ACM national meeting (Pittsburgh)**

Full text available: pdf(1.85 MB) Additional Information: full citation, abstract

A parallel static magnetic memory system was designed to increase by 100 words the fast access-time memory capacity of the ENIAC. At present the ENIAC has only 20 words of internal memory, in the form of electronic accumulators. This small memory capacity limits the size of the problem that can be programmed without repeated reference to the external punched-card memory. The addition of 100 words to the memory capacity will not only enhance the ease of programming problems for the ENIAC ...

6 Optimal RF design using smart evolutionary algorithms
Peter Vancorenland, C. De Ranter, M. Steyaert, G. Gielen
June 2000 **Proceedings of the 37th conference on Design automation**

Full text available: pdf(123.38 KB) Additional Information: full citation, references, citings, index terms

7 Digital design of a surgical simulator for interventional MR imaging (case study)
Terry S. Yoo, Penny Rheingans
October 1999 **Proceedings of the conference on Visualization '99: celebrating ten years**

Full text available: pdf(1.56 MB) Additional Information: full citation, abstract, references, index terms

We present the design of a simulator for a prototype interventional magnetic resonance imaging scanner. This MRI scanner is integrated with an operating theater, enabling new techniques in minimally invasive surgery. The simulator is designed with a threefold purpose: (1) to provide a rehearsal apparatus for practicing and modifying conventional procedures for use in the magnetic environment, (2) to serve as a visualization workstation for procedure planning and previewing as well as a post ...

8 Applications of combinatorial designs in computer science
Charles J. Colbourn, Paul C. van Oorschot
June 1989 **ACM Computing Surveys (CSUR)**, Volume 21 Issue 2

Full text available: pdf(2.99 MB) Additional Information: full citation, abstract, references, citings, index terms, review

The theory of combinatorial designs has been used in widely different areas of computation concerned with the design and analysis of both algorithms and hardware. Combinatorial designs capture a subtle balancing property that is inherent in many difficult problems and hence can provide a sophisticated tool for addressing these problems. The role of combinatorial designs in solving many problems that are basic to the field of computing is explored in this paper. Case studies of many applicat ...

9 Advances in analog modeling: Improving the generality of the fictitious magnetic charge approach to computing inductances in the presence of permeable materials
Yehia Massoud, Jacob White
June 2002 **Proceedings of the 39th conference on Design automation**

Full text available: pdf(239.56 KB) Additional Information: full citation, abstract, references, citings, index terms

In this paper we present an improvement to the fictitious magnetic charge approach to computing inductances in the presence of permeable materials. The improvement replaces integration over a "non-piercing" surface with a line integral and an efficient quadrature scheme. Eliminating the need to generate non-piercing surfaces substantially simplifies handling problems with general geometries of permeable materials. Computational results are presented to demonstrate the accuracy and versatility of ...

10 The use of memory in text processing
Michael Lebowitz
December 1988 **Communications of the ACM**, Volume 31 Issue 12

Full text available: pdf(2.01 MB) Additional Information: full citation, abstract, references, citings, index terms

The performance of a natural language processing system should improve as it reads more and more texts. This is true both for systems intended as cognitive models and for practical text processing systems. Permanent long-term memory should be useful during all stages of text understanding. For example, if, while reading a patent abstract about a new disk drive, a system can retrieve information about similar objects from memory, processing should be simplified. However, most natural languag ...

11 PAS-CIP: An interactive logic design system
Gotaro Odawara, Satoshi Kurishima, Hiroshi Aoyama, Yasuhiko Kanaya
June 1981 **Proceedings of the eighteenth design automation conference on Design automation**

Full text available: pdf(909.48 KB) Additional Information: full citation, abstract, references, citings, index terms

This paper discusses a Circuit Information Processor(CIP), a subsystem of a Packaging Automation System(PAS), currently under development at the University of Tokyo. The CIP is an interactive design system for digital circuits. As an interactive tool for the CIP, a template which is used by the designer to enter the circuit information into the computer data base, has been developed in our laboratory. In the CIP, the data base for the packaging design system is generat ...

12 The calculation of the dimensions for an electromagnet with a T armature.
G. Cividjian, P. Degeratu, O. Cernian
June 1976 **The proceedings of the thirteenth design automation conference on Design automation**

Full text available: pdf(361.34 KB) Additional Information: full citation, abstract, references, index terms

It is presented a computer aided design for the calculation of dimensions of the direct current and alternating current electromagnets with a T plunger, starting from their geometric shape, the lower level of the force in n points of the armature travel and the thermal conditions. The results of the computations are compared with the experimental data.

13 Pen computing: a technology overview and a vision
André Meyer
July 1995 **ACM SIGCHI Bulletin**, Volume 27 Issue 3

Full text available: pdf(5.14 MB) Additional Information: full citation, abstract, citings, index terms

This work gives an overview of a new technology that is attracting growing interest in public as well as in the computer industry itself. The visible difference from other technologies is in the use of a pen or pencil as the primary means of interaction between a user and a machine, picking up the familiar pen and paper interface metaphor. From this follows a set of consequences that will be analyzed and put into context with other emerging technologies and visions.Starting with a short historic ...

14 FastMag: a 3-D magnetostatic inductance extraction program for structures with permeable materials

Yehia Massoud, Jacob White

November 2002 **Proceedings of the 2002 IEEE/ACM international conference on Computer-aided design**

Full text available: pdf(328.77 KB) Additional Information: full citation, abstract, references, index terms

In this paper we present a fast and efficient program for extraction of the frequency dependent inductance of structures with permeable materials. The program, FastMag, uses a magnetic surface charge formulation, efficient techniques for evaluating the required integrals, and a preconditioned GMRES method to solve the resulting linear system. Results from examples are presented to demonstrate the accuracy and versatility of the FastMag program.

15 Digital storage using ferromagnetic materials

A. E. De Barr, R. Millership, P. F. Dorey, R. C. Robbins, P. D. Atkinson

May 1952 **Proceedings of the 1952 ACM national meeting (Pittsburgh)**

Full text available: pdf(1.81 MB) Additional Information: full citation, abstract, references

Advances in the theory of ferromagnetism and, more particularly, increased control of production process, have led to the development of greatly improved magnetic materials and have made it possible to consider the use of ferromagnetic elements or devices for many types of circuit application. They would seem particularly attractive as circuit elements for digital computers and, in particular for storage systems. In this short paper a brief account will be given of four types of digital storage ...

16 Modeling and performance of MEMS-based storage devices

John Linwood Griffin, Steven W. Schlosser, Gregory R. Ganger, David F. Nagle

June 2000 **ACM SIGMETRICS Performance Evaluation Review , Proceedings of the 2000 ACM SIGMETRICS international conference on Measurement and modeling of computer systems**, Volume 28 Issue 1

Full text available: pdf(892.07 KB) Additional Information: full citation, abstract, references, citings, index terms

MEMS-based storage devices are seen by many as promising alternatives to disk drives. Fabricated using conventional CMOS processes, MEMS-based storage consists of thousands of small, mechanical probe tips that access gigabytes of high-density, nonvolatile magnetic storage. This paper takes a first step towards understanding the performance characteristics of these devices by mapping them onto a disk-like metaphor. Using simulation models based on the mechanics equations governing the device ...

17 Emerging design and tool challenges in RF and wireless applications: RF front end application and technology trends

Pieter W. Hooijmans

June 2003 **Proceedings of the 40th conference on Design automation**

Full text available: pdf(151.37 KB) Additional Information: full citation, abstract, index terms

In this paper we discuss the many issues around the system and circuit design of advanced

RF front ends for mobile, wireless and consumer RF applications. After an analysis of the application trends, technology choices linked to the different system solutions will be discussed.

Keywords: BiCMOS, RF, RF-CMOS, SoC, front ends, integration technology, receivers, system design, transmitters

18 A Survey of Microcellular Research

Robert C. Minnick

April 1967 **Journal of the ACM (JACM)**, Volume 14 Issue 2

Full text available: pdf(3.57 MB) Additional Information: full citation, abstract, references, citings, index terms

This paper is a survey of research on microcellular techniques. Of particular interest are those techniques that are appropriate for realization by modern batch-fabrication processes, since the rapid emergence of reliable and economical batch-fabricated components represents probably the most important current trend in the field of digital circuits. First the manufacturing methods for batch-fabricated components are reviewed, and the advantages to be realized from the application ...

19 MEMS-based integrated-circuit mass-storage systems

L. Richard Carley, Gregory R. Ganger, David F. Nagle

November 2000 **Communications of the ACM**, Volume 43 Issue 11

Full text available: pdf(577.78 KB) html(41.51 KB) Additional Information: full citation, references, citings, index terms

20 Visualizing DIII-D Tokamak magnetic field lines

Greg Schussman, Kwan-Liu Ma, David Schissel, Todd Evans

October 2000 **Proceedings of the conference on Visualization '00**

Full text available: pdf(1.13 MB) Additional Information: full citation, index terms

Keywords: graphics hardware, haloed lines, illuminated lines, interactive visualization, magentic field, plasma physics, tokamak

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2 Interactive 3D visualization of actual anatomy and simulated chemical time-course data for fish

P. Rheingans, M. Marietta, J. Nichols

October 1995 **Proceedings of the 6th conference on Visualization '95**

Full text available: pdf(702.50 KB) Publisher Site Additional Information: full citation, abstract

Outputs from a physiologically based toxicokinetic (PB-TK) model for fish were visualized by mapping time series data for specific tissues onto a three dimensional representation of a rainbow trout. The trout representation was generated in stepwise fashion: cross sectional images were obtained from an anesthetized fish using a magnetic resonance imaging (MRI) system; images were processed to classify tissue types; images were stacked and processed to create a three dimensional representation of ...

Keywords: actual anatomy, anesthetized fish, biology computing, biomedical NMR, chemical concentration, chemistry computing, continuous branchial exposure, cross sectional images, data visualisation, gastrointestinal tract, image representation, interactive 3D visualization, interactive systems, kinetic data, magnetic resonance imaging, pentachloroethane, physiologically based toxicokinetic model, rainbow trout, simulated chemical time-course data, three dimensional representation, time series data, tissue volumes, zoology

3 Digital design of a surgical simulator for interventional MR imaging (case study)

Terry S. Yoo, Penny Rheingans

h be c g e cf c

October 1999 **Proceedings of the conference on Visualization '99: celebrating ten years**

Full text available: pdf(1.56 MB) Additional Information: full citation, abstract, references, index terms

We present the design of a simulator for a prototype interventional magnetic resonance imaging scanner. This MRI scanner is integrated with an operating theater, enabling new techniques in minimally invasive surgery. The simulator is designed with a threefold purpose: (1) to provide a rehearsal apparatus for practicing and modifying conventional procedures for use in the magnetic environment, (2) to serve as a visualization workstation for procedure planning and previewing as well as a post ...

4 An iterative method for improved protein structural motif recognition

Bonnie Berger, Mona Singh

January 1997 **Proceedings of the first annual international conference on Computational molecular biology**

Full text available: pdf(1.32 MB) Additional Information: full citation, references, index terms

5 Bioinformatics: Weave amino acid sequences for protein secondary structure prediction

Xiaochun Yang, Bin Wang

June 2003 **Proceedings of the 8th ACM SIGMOD workshop on Research issues in data mining and knowledge discovery**

Full text available: pdf(160.75 KB) Additional Information: full citation, abstract, references, index terms

Given a known protein sequence, predicting its secondary structure can help understand its three-dimensional (tertiary) structure, i.e., the folding. In this paper, we present an approach for predicting protein secondary structures. Different from the existing prediction methods, our approach proposes an encoding schema that weaves physio-chemical information in encoded vectors and a prediction framework that combines the context information with secondary structure segments. We employed Support ...

Keywords: SVM, encoding schema, protein secondary structure, protein structure prediction

6 SIGSAM BULLETIN: Computer algebra in the life sciences

Michael P. Barnett

December 2002 **ACM SIGSAM Bulletin**, Volume 36 Issue 4

Full text available: pdf(240.15 KB) Additional Information: full citation, abstract, references

This note (1) provides references to recent work that applies computer algebra (CA) to the life sciences, (2) cites literature that explains the biological background of each application, (3) states the mathematical methods that are used, (4) mentions the benefits of CA, and (5) suggests some topics for future work.

7 A survey of image registration techniques

Lisa Gottesfeld Brown

December 1992 **ACM Computing Surveys (CSUR)**, Volume 24 Issue 4

Full text available: pdf(5.20 MB) Additional Information: full citation, abstract, references, citings, index terms, review

Registration is a fundamental task in image processing used to match two or more pictures taken, for example, at different times, from different sensors, or from different viewpoints. Virtually all large systems which evaluate images require the registration of images, or a closely related operation, as an intermediate step. Specific examples of systems where image registration is a significant component include matching a target with a real-time

image of a scene for target recognition, mon ...

Keywords: image registration, image warping, rectification, template matching

8 Parallel hierarchical molecular structure estimation

Cheng Che Chen, Jaswinder Pal Singh, Russ B. Altman

November 1996 **Proceedings of the 1996 ACM/IEEE conference on Supercomputing (CDROM)**

Full text available: pdf(220.93 KB) Additional Information: full citation, abstract, references, citings, index terms

Determining the structure of biological macromolecules such as proteins and nucleic acids is an important element of molecular biology because of the intimate relation between form and function of these molecules. Individual sources of data about molecular structure are subject to varying degrees of uncertainty. Previously we have examined the parallelization of a probabilistic algorithm for combining multiple sources of uncertain data to estimate the three-dimensional structure of molecule ...

9 Visual illiteracy: implications in the development of scientific visualization software

George N. McGregor

November 1995 **ACM SIGGRAPH Computer Graphics**, Volume 29 Issue 4

Full text available: pdf(344.14 KB) Additional Information: full citation, abstract, index terms

Visual illiteracy occurs whenever there is insufficient understanding in the purpose of a visual presentation. Close collaboration between the designers and end users of biomedical analysis software will alleviate visual illiteracy problems. Two case histories illustrating this approach are presented.

10 Visualization: A toolkit for visualizing biomedical data sets

Burkhard C. Wünsche

February 2003 **Proceedings of the 1st international conference on Computer graphics and interactive techniques in Austalasia and South East Asia**

Full text available: pdf(2.33 MB) Additional Information: full citation, abstract, references, citings, index terms

Medical data sets now comprise a diverse range of measurements such as tissue densities, sensitivity to magnetization, blood flow velocity, and material strain. The size and complexity of medical data sets makes it increasingly difficult to understand, compare, analyze and communicate the data. Visualization is an attempt to simplify these tasks according to the motto "An image says more than a thousand words". Representing complex material properties, such as strain, as a single image improves ...

Keywords: biomedicine, tensor fields, user interfaces, visualization

11 Tensorlines: advection-diffusion based propagation through diffusion tensor fields

David Weinstein, Gordon Kindlmann, Eric Lundberg

October 1999 **Proceedings of the conference on Visualization '99: celebrating ten years**

Full text available: pdf(1.92 MB) Additional Information: full citation, abstract, references, citings, index terms

Tracking linear features through tensor field datasets is an open research problem with widespread utility in medical and engineering disciplines. Existing tracking methods, which consider only the preferred local diffusion direction as they propagate, fail to accurately follow features as they enter regions of local complexity. This shortcoming is a result of partial voluming; that is, voxels in these regions often contain contributions from multiple

features. These combin ...

12 Visualizing diffusion tensor images of the mouse spinal cord
David H. Laidlaw, Eric T. Ahrens, David Kremers, Matthew J. Avalos, Russell E. Jacobs, Carol Readhead
October 1998 **Proceedings of the conference on Visualization '98**

Full text available: pdf(2.17 MB) Publisher Site Additional Information: full citation, references, citings, index terms

Keywords: multi-valued visualization, oil painting, tensor field visualization

13 Blood-brain barrier permeability in rats exposed to electromagnetic fields used in wireless communication
Bertil R. R. Persson, Leif G. Salford, Arne Brun
November 1997 **Wireless Networks**, Volume 3 Issue 6

Full text available: pdf(701.27 KB) Additional Information: full citation, abstract, references, citings, index terms

Biological effects of radio frequency electromagnetic fields (EMF) on the blood-brain barrier (BBB) have been studied in Fischer 344 rats of both sexes. The rats were not anaesthetised during the exposure. All animals were sacrificed by perfusion--fixation of the brains under chloralhydrate anaesthesia after the exposure. The brains were perfused with saline for 3–4 minutes, and thereafter perfusion fixed with 4% formaldehyde for 5–6 minutes. Whole coronal sections of the brains ...

14 Hue-balls and lit-tensors for direct volume rendering of diffusion tensor fields
Gordon Kindlmann, David Weinstein
October 1999 **Proceedings of the conference on Visualization '99: celebrating ten years**

Full text available: pdf(2.26 MB) Additional Information: full citation, abstract, references, citings, index terms

With the development of magnetic resonance imaging techniques for acquiring diffusion tensor data from biological tissue, visualization of tensor data has become a new research focus. The diffusion tensor describes the directional dependence of water molecules' diffusion and can be represented by a three-by-three symmetric matrix. Visualization of second-order tensor fields is difficult because the data values have many degrees of freedom. Existing visualization techniques are best at portr ...

15 Supercomputer assisted brain visualization with an extended ray tracer
Don Stredney, Roni Yagel, Stephen F. May, Michael Torello
December 1992 **Proceedings of the 1992 workshop on Volume visualization**

Full text available: pdf(754.13 KB) Additional Information: full citation, references, citings, index terms

16 Marching through the Visible Man
W. E. Lorensen
October 1995 **Proceedings of the 6th conference on Visualization '95**

Full text available: pdf(2.31 MB) Publisher Site Additional Information: full citation, abstract

The National Library of Medicine is creating a digital atlas of the human body. This project,

called the Visible Human, has already produced computed tomography, magnetic resonance imaging and physical cross-sections of a human male cadaver. This paper describes a methodology and results for extracting surfaces from the Visible Male's CT data. We use surface connectivity and isosurface extraction techniques to create polygonal models of the skin, bone, muscle and bowels. We also report early exp ...

Keywords: National Library of Medicine, Visible Man, biology computing, biomedical NMR, bone, bowels, computed tomography, computerised tomography, data visualisation, human body, human male cadaver, isosurface extraction, library automation, magnetic resonance imaging, medical computing, medical image processing, muscle, polygonal models, skin, special libraries, surface connectivity

17 A three-dimensional computational model of a thin-walled left ventricle

C. C. Vesier, J. D. Lemmon, R. A. Levine, A. P. Yoganathan

December 1992 **Proceedings of the 1992 ACM/IEEE conference on Supercomputing**

Full text available: pdf(869.73 KB) Additional Information: full citation, references, index terms

18 Tensor Product Surfaces Guided by Minimal Surface Area Triangulations

John K. Johnstone, Kenneth R. Sloan

October 1995 **Proceedings of the 6th conference on Visualization '95**

Full text available: pdf(1.03 MB) Additional Information: full citation, abstract

Publisher Site

We present a method for constructing tensor product Bezier surfaces from contour (cross-section) data. Minimal area triangulations are used to guide the surface construction, and the final surface reflects the optimality of the triangulation. The resulting surface differs from the initial triangulation in two important ways: it is smooth (as opposed to the piecewise planar triangulation), and it is in tensor product form (as opposed to the irregular triangular mesh). The surface reconstruction i ...

Keywords: surface reconstruction, contour data, minimum area triangulation, Bezier surface, biomedical visualization

19 Matching simulation and experiment (extended abstract): a new simplified model for simulating protein folding

Jon M. Sorenson, Teresa Head-Gordon

April 2000 **Proceedings of the fourth annual international conference on Computational molecular biology**

Full text available: pdf(951.54 KB) Additional Information: full citation, abstract, references

Simulations of simplified protein folding models have provided much insight into solving the protein folding problem. We propose here a new off-lattice bead model, capable of simulating several different fold classes of small proteins. We present the sequence for an &agr;/&bgr; protein resembling the IgG-binding proteins L and G. The thermodynamics of the folding process for this model are characterized using the multiple multi-histogram method combined with constant-temperature Langevin simu ...

20 The principled design of large-scale recursive neural network architectures--dag-rnns and the protein structure prediction problem

Pierre Baldi, Gianluca Pollastri

September 2003 **The Journal of Machine Learning Research**, Volume 4

h be c g e cf c

Full text available: pdf(231.40 KB) Additional Information: full citation, abstract

We describe a general methodology for the design of large-scale recursive neural network architectures (DAG-RNNs) which comprises three fundamental steps: (1) representation of a given domain using suitable directed acyclic graphs (DAGs) to connect visible and hidden node variables; (2) parameterization of the relationship between each variable and its parent variables by feedforward neural networks; and (3) application of weight-sharing within appropriate subsets of DAG connections to capture s ...

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December 1988 **Communications of the ACM**, Volume 31 Issue 12

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The performance of a natural language processing system should improve as it reads more and more texts. This is true both for systems intended as cognitive models and for practical text processing systems. Permanent long-term memory should be useful during all stages of text understanding. For example, if, while reading a patent abstract about a new disk drive, a system can retrieve information about similar objects from memory, processing should be simplified. However, most natural languag ...

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George A. O'Sullivan

June 1970 **Proceedings of the June 1970 design automation workshop on Design automation**

Full text available: pdf(541.28 KB) Additional Information: full citation, abstract, references, index terms

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4 A static magnetic memory system for the ENIAC
Isaac L. Auerbach
May 1952 **Proceedings of the 1952 ACM national meeting (Pittsburgh)**
Full text available: pdf(1.85 MB) Additional Information: full citation, abstract

A parallel static magnetic memory system was designed to increase by 100 words the fast access-time memory capacity of the ENIAC. At present the ENIAC has only 20 words of internal memory, in the form of electronic accumulators. This small memory capacity limits the size of the problem that can be programmed without repeated reference to the external punched-card memory. The addition of 100 words to the memory capacity will not only enhance the ease of programming problems for the ENIAC ...

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June 2002 **Proceedings of the 39th conference on Design automation**
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6 Visualizing DIII-D Tokamak magnetic field lines
Greg Schussman, Kwan-Liu Ma, David Schissel, Todd Evans
October 2000 **Proceedings of the conference on Visualization '00**
Full text available: pdf(1.13 MB) Additional Information: full citation, index terms

Keywords: graphics hardware, haloed lines, illuminated lines, interactive visualization, magentic field, plasma physics, tokamak

7 Digital storage using ferromagnetic materials
A. E. De Barr, R. Millership, P. F. Dorey, R. C. Robbins, P. D. Atkinson
May 1952 **Proceedings of the 1952 ACM national meeting (Pittsburgh)**
Full text available: pdf(1.81 MB) Additional Information: full citation, abstract, references

Advances in the theory of ferromagnetism and, more particularly, increased control of production process, have led to the development of greatly improved magnetic materials and have made it possible to consider the use of ferromagnetic elements or devices for many types of circuit application. They would seem particularly attractive as circuit elements for digital computers and, in particular for storage systems. In this short paper a brief account will be given of four types of digital storage ...

8 The calculation of the dimensions for an electromagnet with a T armature.
G. Cividjian, P. Degeratu, O. Cernian
June 1976 **The proceedings of the thirteenth design automation conference on Design automation**
Full text available: pdf(361.34 KB) Additional Information: full citation, abstract, references, index terms

It is presented a computer aided design for the calculation of dimensions of the direct

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current and alternating current electromagnets with a T plunger, starting from their geometric shape, the lower level of the force in n points of the armature travel and the thermal conditions. The results of the computations are compared with the experimental data.

9 MIT educators share success

John W. Belcher, R. Mark Bessette

February 2001 **ACM SIGGRAPH Computer Graphics**, Volume 35 Issue 1

Full text available: pdf(1.03 MB) Additional Information: full citation, abstract, index terms

This column describes the use of computer graphics as a teaching tool. At MIT, the course Physics 8.02 has a high enrollment, but it is one of the more difficult classes for students because of the non-intuitive nature of electromagnetism. In order to properly demonstrate the phenomena, Professor John Belcher developed a series of short videos with animation and text of selected experiments. He emphasizes that "the power of animation in explaining electromagnetism can only be appreciated by view ...

10 FastMag: a 3-D magnetostatic inductance extraction program for structures with permeable materials

Yehia Massoud, Jacob White

November 2002 **Proceedings of the 2002 IEEE/ACM international conference on Computer-aided design**

Full text available: pdf(328.77 KB) Additional Information: full citation, abstract, references, index terms

In this paper we present a fast and efficient program for extraction of the frequency dependent inductance of structures with permeable materials. The program, FastMag, uses a magnetic surface charge formulation, efficient techniques for evaluating the required integrals, and a preconditioned GMRES method to solve the resulting linear system. Results from examples are presented to demonstrate the accuracy and versatility of the FastMag program.

11 Laser optical disk: the coming revolution in on-line storage

Larry Fujitani

June 1984 **Communications of the ACM**, Volume 27 Issue 6

Full text available: pdf(1.56 MB) Additional Information: full citation, abstract, citings, index terms

Commercially available only recently, the optical disk drive uses a laser beam to burn impressions onto a plastic disk. Employing a highly focused beam rather than a diffuse magnetic field to write, the laser optical disk drive yields storage densities up to 10 times those of magnetic disks.

Keywords: applications for laser disk drives, laser disk drives versus magnetic disk drives, laser disks and the dawn of the information age, new technology, on-line secondary storage, on-line tertiary storage, optical disk space

12 Magneto-optical data storage

Terry McDaniel

November 2000 **Communications of the ACM**, Volume 43 Issue 11

Full text available: pdf(397.56 KB) html(34.62 KB) Additional Information: full citation, references, index terms

13 The future of automatic digital computers

Andrew D. Booth

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June 1960 **Communications of the ACM**, Volume 3 Issue 6

Full text available: pdf(508.75 KB) Additional Information: full citation, abstract, references

Before discussing the future I want to talk about the past, which I find a source of disappointment. One of the things which prompted me to give the lecture its title was that a number of people who should know better have recently given tongue and pen to the statement that "new, second generation computers are with us" and that these machines are better than anything which has been thought of before. The first part of this lecture will attempt to disabuse you of this idea for, ...

14 ToolStone: effective use of the physical manipulation vocabularies of input devices

Jun Rekimoto, Eduardo Sciammarella

November 2000 **Proceedings of the 13th annual ACM symposium on User interface software and technology**

Full text available: pdf(680.77 KB) Additional Information: full citation, references, citings, index terms

Keywords: input devices, interaction techniques, multiple function inputs, multiple-degree-of-freedom input, physical user interfaces, two-handed input

15 Pen computing: a technology overview and a vision

André Meyer

July 1995 **ACM SIGCHI Bulletin**, Volume 27 Issue 3

Full text available: pdf(5.14 MB) Additional Information: full citation, abstract, citings, index terms

This work gives an overview of a new technology that is attracting growing interest in public as well as in the computer industry itself. The visible difference from other technologies is in the use of a pen or pencil as the primary means of interaction between a user and a machine, picking up the familiar pen and paper interface metaphor. From this follows a set of consequences that will be analyzed and put into context with other emerging technologies and visions.Starting with a short historic ...

16 MEMS-based integrated-circuit mass-storage systems

L. Richard Carley, Gregory R. Ganger, David F. Nagle

November 2000 **Communications of the ACM**, Volume 43 Issue 11

Full text available: pdf(577.78 KB) html(41.51 KB) Additional Information: full citation, references, citings, index terms

17 Modeling and performance of MEMS-based storage devices

John Linwood Griffin, Steven W. Schlosser, Gregory R. Ganger, David F. Nagle

June 2000 **ACM SIGMETRICS Performance Evaluation Review , Proceedings of the 2000 ACM SIGMETRICS international conference on Measurement and modeling of computer systems**, Volume 28 Issue 1

Full text available: pdf(892.07 KB) Additional Information: full citation, abstract, references, citings, index terms

MEMS-based storage devices are seen by many as promising alternatives to disk drives. Fabricated using conventional CMOS processes, MEMS-based storage consists of thousands of small, mechanical probe tips that access gigabytes of high-density, nonvolatile magnetic storage. This paper takes a first step towards understanding the performance characteristics of these devices by mapping them onto a disk-like metaphor. Using simulation models based on the mechanics equations governing the device ...

18 Spatial input/display correspondence in a stereoscopic computer graphic work station

Christopher Schmandt

July 1983 **Proceedings of the 10th annual conference on Computer graphics and interactive techniques**

Full text available: pdf(1.09 MB) Additional Information: full citation, abstract, references, citings, index terms

An interactive stereoscopic computer graphic workspace is described. A conventional frame store is used for three-dimensional display, with left/right eye views interlaced in video and viewed through PLZT shutter glasses. The video monitor is seen reflected from a half silvered mirror which projects the graphics into a workspace, into which one can reach and manipulate the image directly with a "magic wand". The wand uses a magnetic six degree-of-freedom digitizer. In an alterna ...

Keywords: Stereoscopic display, half silvered mirror, three-dimensional digitization

19 CYCLONE: automated design and layout of RF LC-oscillators

C. De Ranter, B. De Muer, G. Van der Plas, P. Vancorenland, M. Steyaert, G. Gielen, W. Sansen

June 2000 **Proceedings of the 37th conference on Design automation**

Full text available: pdf(163.78 KB) Additional Information: full citation, abstract, references, citings, index terms

This paper presents an automated, layout-aware RF LC-oscillator design tool, called CYCLONE that delivers an accurate and optimal LC-oscillator design, from specification to layout. The tool combines the accuracy of device-level simulation and finite element analysis with the optimisation power of simulated annealing algorithms and is verified with experimental results.

20 Digital design of a surgical simulator for interventional MR imaging (case study)

Terry S. Yoo, Penny Rheingans

October 1999 **Proceedings of the conference on Visualization '99: celebrating ten years**

Full text available: pdf(1.56 MB) Additional Information: full citation, abstract, references, index terms

We present the design of a simulator for a prototype interventional magnetic resonance imaging scanner. This MRI scanner is integrated with an operating theater, enabling new techniques in minimally invasive surgery. The simulator is designed with a threefold purpose: (1) to provide a rehearsal apparatus for practicing and modifying conventional procedures for use in the magnetic environment, (2) to serve as a visualization workstation for procedure planning and previewing as well as a post ...

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1 SIGSAM BULLETIN: Computer algebra in the life sciences

Michael P. Barnett

December 2002 **ACM SIGSAM Bulletin**, Volume 36 Issue 4

Full text available: pdf(240.15 KB) Additional Information: full citation, abstract, references

This note (1) provides references to recent work that applies computer algebra (CA) to the life sciences, (2) cites literature that explains the biological background of each application, (3) states the mathematical methods that are used, (4) mentions the benefits of CA, and (5) suggests some topics for future work.

2 Towards the ultimate APL-TOE

Gérard A. Langlet

July 1992 **ACM SIGAPL APL Quote Quad , Proceedings of the international conference on APL**, Volume 23 Issue 1

Full text available: pdf(1.69 MB) Additional Information: full citation, abstract, references, citings, index terms

This paper presents the results of more than 10 years of transdisciplinary work. The initial idea was: can the laws of Nature also been found of rebuilt, independently from theoretical research in Physics (on elementary particles and matter in general), also in the field of Computer Science i.e. Information Processing? Pressing a lemon reveals its juice and stones; if one "tortures" matter, the components of its (first electrons, neutrons and protons, then quarks and gluons at a ...

Keywords: APL, Fibonacci, T.O.E., automata, binary algebra, chaos, dynamical systems, fractals, genetics, holography, integrals, parity, periodic systems, propagation, symmetry, topology

3 Formulation of design rules for NMR imaging coil by using symbolic manipulation

John F. Schenck, M. A. Hussain

August 1981 **Proceedings of the fourth ACM symposium on Symbolic and algebraic computation**

Full text available: pdf(537.79 KB) Additional Information: full citation, abstract, references, index terms

A common problem in electrical technology is to design a current carrying coil that will produce a given magnetic field. For over a hundred years an equation, the Biot-Savart law, has been available that defines precisely the magnetic field at any point as a line integral

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along the path of the electric currents that are the sources of the field. In principle then, the design problem is straightforward - it is merely necessary to invert the Biot-Savart law and find a path whose line integral ...

4 A survey of image registration techniques

Lisa Gottesfeld Brown

December 1992 **ACM Computing Surveys (CSUR)**, Volume 24 Issue 4

Full text available: pdf(5.20 MB) Additional Information: full citation, abstract, references, citings, index terms, review

Registration is a fundamental task in image processing used to match two or more pictures taken, for example, at different times, from different sensors, or from different viewpoints. Virtually all large systems which evaluate images require the registration of images, or a closely related operation, as an intermediate step. Specific examples of systems where image registration is a significant component include matching a target with a real-time image of a scene for target recognition, mon ...

Keywords: image registration, image warping, rectification, template matching

5 Session P13: tensor visualization: Tensor field visualisation using adaptive filtering of noise fields combined with glyph rendering

Andreas Sigfridsson, Tino Ebbers, Einar Heiberg, Lars Wigström

October 2002 **Proceedings of the conference on Visualization '02**

Full text available: pdf(4.56 MB) Additional Information: full citation, abstract, references, index terms

While many methods exist for visualising scalar and vector data, visualisation of tensor data is still troublesome. We present a method for visualising second order tensors in three dimensions using a hybrid between direct volume rendering and glyph rendering.An overview scalar field is created by using three-dimensional adaptive filtering of a scalar field containing noise. The filtering process is controlled by the tensor field to be visualised, creating patterns that characterise the tensor f ...

Keywords: glyph rendering, hybrid rendering, strain-rate, tensor, visualisation, volume rendering

6 Visualization: A toolkit for visualizing biomedical data sets

Burkhard C. Wünsche

February 2003 **Proceedings of the 1st international conference on Computer graphics and interactive techniques in Austalasia and South East Asia**

Full text available: pdf(2.33 MB) Additional Information: full citation, abstract, references, citings, index terms

Medical data sets now comprise a diverse range of measurements such as tissue densities, sensitivity to magnetization, blood flow velocity, and material strain. The size and complexity of medical data sets makes it increasingly difficult to understand, compare, analyze and communicate the data. Visualization is an attempt to simplify these tasks according to the motto "An image says more than a thousand words". Representing complex material properties, such as strain, as a single image improves ...

Keywords: biomedicine, tensor fields, user interfaces, visualization

7 Blood-brain barrier permeability in rats exposed to electromagnetic fields used in wireless communication

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Bertil R. R. Persson, Leif G. Salford, Arne Brun
November 1997 **Wireless Networks**, Volume 3 Issue 6

Full text available: pdf(701.27 KB) Additional Information: full citation, abstract, references, citings, index terms

Biological effects of radio frequency electromagnetic fields (EMF) on the blood-brain barrier (BBB) have been studied in Fischer 344 rats of both sexes. The rats were not anaesthetised during the exposure. All animals were sacrificed by perfusion--fixation of the brains under chloralhydrate anaesthesia after the exposure. The brains were perfused with saline for 3–4 minutes, and thereafter perfusion fixed with 4% formaldehyde for 5–6 minutes. Whole coronal sections of the brains ...

8 Hue-balls and lit-tensors for direct volume rendering of diffusion tensor fields
Gordon Kindlmann, David Weinstein
October 1999 **Proceedings of the conference on Visualization '99: celebrating ten years**

Full text available: pdf(2.26 MB) Additional Information: full citation, abstract, references, citings, index terms

With the development of magnetic resonance imaging techniques for acquiring diffusion tensor data from biological tissue, visualization of tensor data has become a new research focus. The diffusion tensor describes the directional dependence of water molecules' diffusion and can be represented by a three-by-three symmetric matrix. Visualization of second-order tensor fields is difficult because the data values have many degrees of freedom. Existing visualization techniques are best at portr ...

9 Marching through the Visible Man
W. E. Lorensen
October 1995 **Proceedings of the 6th conference on Visualization '95**

Full text available: pdf(2.31 MB) Publisher Site Additional Information: full citation, abstract

The National Library of Medicine is creating a digital atlas of the human body. This project, called the Visible Human, has already produced computed tomography, magnetic resonance imaging and physical cross-sections of a human male cadaver. This paper describes a methodology and results for extracting surfaces from the Visible Male's CT data. We use surface connectivity and isosurface extraction techniques to create polygonal models of the skin, bone, muscle and bowels. We also report early exp ...

Keywords: National Library of Medicine, Visible Man, biology computing, biomedical NMR, bone, bowels, computed tomography, computerised tomography, data visualisation, human body, human male cadaver, isosurface extraction, library automation, magnetic resonance imaging, medical computing, medical image processing, muscle, polygonal models, skin, special libraries, surface connectivity

10 Supercomputer assisted brain visualization with an extended ray tracer
Don Stredney, Roni Yagel, Stephen F. May, Michael Torello
December 1992 **Proceedings of the 1992 workshop on Volume visualization**

Full text available: pdf(754.13 KB) Additional Information: full citation, references, citings, index terms

11 Session C2: bio-medical I: Case study: an environment for understanding protein simulations using game graphics
Donna Gresh, Frank Suits, Yuk Yin Sham
October 2001 **Proceedings of the conference on Visualization '01**

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Full text available: pdf(470.15 KB) Additional Information: full citation, abstract, references, index terms

We describe a visualization system designed for interactive study of proteins in the field of computational biology. Our system incorporates multiple, custom, three-dimensional and two-dimensional linked views of the proteins. We take advantage of modern commodity graphics cards, which are typically designed for games rather than scientific visualization applications, to provide instantaneous linking between views and three-dimensional interactivity on standard personal computers. Furthermore, w ...

Keywords: computational biology, directX, game graphics, molecular dynamics, molecular modeling, proteins, visualization

12 An approach to 3D pose determination

Norberto Ezquerra, Rakesh Mullick
April 1996 **ACM Transactions on Graphics (TOG)**, Volume 15 Issue 2

Full text available: pdf(5.58 MB) Additional Information: full citation, abstract, references, index terms, review

The orientation, or pose, of an object is a fundamental property that helps to define the geometrical relationship between the object and its environment. In addition, knowledge of object orientation can also facilitate interpretive and decision-making tasks in a variety of practical domains, including industrial, meteorological, and medical applications. Determining object pose, however, remains an open research question in the fields of graphics and visualization. This article describes a ...

Keywords: axis of orientation, geometry, orientation determination, pose determination

13 A rule-based tool for assisting colormap selection

L. D. Bergman, B. E. Rogowitz, L. A. Treinish
October 1995 **Proceedings of the 6th conference on Visualization '95**

Full text available: pdf(1.77 MB) Publisher Site Additional Information: full citation, abstract

The paper presents an interactive approach for guiding the user's select of colormaps in visualization. PRAVDAColor, implemented as a module in the IBM Visualization Data Explorer, provides the user a selection of appropriate colormaps given the data type and spatial frequency, the user's task, and properties of the human perceptual system.

Keywords: IBM Visualization Data Explorer, PRAVDAColor, colormap selection, colour graphics, data analysis, data type, data visualisation, expert systems, human perceptual system, rule-based tool, spatial frequency

14 Interactive 3D visualization of actual anatomy and simulated chemical time-course data for fish

P. Rheingans, M. Marietta, J. Nichols
October 1995 **Proceedings of the 6th conference on Visualization '95**

Full text available: pdf(702.50 KB) Publisher Site Additional Information: full citation, abstract

Outputs from a physiologically based toxicokinetic (PB-TK) model for fish were visualized by mapping time series data for specific tissues onto a three dimensional representation of a rainbow trout. The trout representation was generated in stepwise fashion: cross sectional

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images were obtained from an anesthetized fish using a magnetic resonance imaging (MRI) system; images were processed to classify tissue types; images were stacked and processed to create a three dimensional representation of ...

Keywords: actual anatomy, anesthetized fish, biology computing, biomedical NMR, chemical concentration, chemistry computing, continuous branchial exposure, cross sectional images, data visualisation, gastrointestinal tract, image representation, interactive 3D visualization, interactive systems, kinetic data, magnetic resonance imaging, pentachloroethane, physiologically based toxicokinetic model, rainbow trout, simulated chemical time-course data, three dimensional representation, time series data, tissue volumes, zoology

15 Special issue on spatial database systems: The TV-tree: an index structure for high-dimensional data

King Ip Lin, H. V. Jagadish, Christos Faloutsos

October 1994 **The VLDB Journal — The International Journal on Very Large Data Bases**, Volume 3 Issue 4

Full text available: pdf(1.24 MB) Additional Information: full citation, abstract, references, citings

We propose a file structure to index high-dimensionality data, which are typically points in some feature space. The idea is to use only a few of the features, using additional features only when the additional discriminatory power is absolutely necessary. We present in detail the design of our tree structure and the associated algorithms that handle such "varying length" feature vectors. Finally, we report simulation results, comparing the proposed structure with the *R**-tree, which is on ...

Keywords: query by content, similarity retrieval, spatial index

16 Session P14: biomedical applications: Volume rendering of fine details within medical data

Feng Dong, Gordon J. Clapworthy, Mel Krokos

October 2001 **Proceedings of the conference on Visualization '01**

Full text available: pdf(510.04 KB) Additional Information: full citation, abstract, references, index terms

This paper presents a method concerning the volume rendering of fine details, such as blood vessels and nerves, from medical data. The realistic and efficient visualization of such structures is often of great medical interest, and conventional rendering techniques do not always deal with them adequately. Our method uses preprocessing to reconstruct fine details that are difficult to segment and label. It detects the presence of fine geometrical structures, such as cracks or cylinders that sugge ...

Keywords: fine details, image processing, medical visualization, volume rendering, volume textures

17 Pen computing: a technology overview and a vision

André Meyer

July 1995 **ACM SIGCHI Bulletin**, Volume 27 Issue 3

Full text available: pdf(5.14 MB) Additional Information: full citation, abstract, citings, index terms

This work gives an overview of a new technology that is attracting growing interest in public as well as in the computer industry itself. The visible difference from other technologies is in the use of a pen or pencil as the primary means of interaction between a user and a machine, picking up the familiar pen and paper interface metaphor. From this follows a set of consequences that will be analyzed and put into context with other emerging technologies

and visions.Starting with a short historic ...

18 UNRES: a united-residue force field for energy-based prediction of protein structure—orgin and significance of multibody terms

Adam Liwo, Jaroslaw Pillardy, Cezary Czaplewski, Jooyoung Lee, Daniel R. Ripoll, Malgorzata Groth, Sylwia Rodziewicz-Motowidlo, Rajmund Kamierkiewicz, Ryszard J. Wawak, Stanislaw Oldziej, Harold A. Scheraga

April 2000 **Proceedings of the fourth annual international conference on Computational molecular biology**

Full text available: pdf(598.82 KB) Additional Information: full citation, abstract, references

United-residue models of polypeptide chains [3, 5, 19-22, 24, 31, 33] have long been of interest, because they enable one to carry out global conformational searches of proteins in real time, which in turn can facilitate ab initio protein structure predictions based solely on Anfinsen's thermodynamic hypothesis [1], according to which the native structure of a protein is a global minimum of its potential energy surface [32]. In the last few years, we developed a united-resi ...

19 The principled design of large-scale recursive neural network architectures--dag-rnns and the protein structure prediction problem

Pierre Baldi, Gianluca Pollastri

September 2003 **The Journal of Machine Learning Research**, Volume 4

Full text available: pdf(231.40 KB) Additional Information: full citation, abstract

We describe a general methodology for the design of large-scale recursive neural network architectures (DAG-RNNs) which comprises three fundamental steps: (1) representation of a given domain using suitable directed acyclic graphs (DAGs) to connect visible and hidden node variables; (2) parameterization of the relationship between each variable and its parent variables by feedforward neural networks; and (3) application of weight-sharing within appropriate subsets of DAG connections to capture s ...

20 Direct volume rendering with shading via three-dimensional textures

Allen Van Gelder, Kwansik Kim

October 1996 **Proceedings of the 1996 symposium on Volume visualization**

Full text available: pdf(3.97 MB) Additional Information: full citation, references, citings, index terms

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